

Our Ref AN-C32/1

16-6-81

Keyboard Interface KBP-IX

(Of particular interest to potential users  
of ZYMON 1 and Tiny BASIC V5.01)

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# ASCII KBP-IX Keyboard Interface

Introduction This is intended as a replacement for the Kematron DCR-6 Board, which had some disadvantages, particularly when used in Z80 systems.

## Disadvantages of DCR-6

1. Only the first 10 of the possible 16 '4k Page Selects' were provided - this means Page C (ie. The VDU Address) cannot be reached without modifying the board.
2. The Page selects provided did not include the NMREQ signal in the decoding - ie. modification was needed if the separate memory and I/O spaces were employed in the system (e.g. with Z80)
3. No specific I/O port decoding was provided. The DM 8131 device had insufficient inputs to decode the 8-bit I/O Port Address and also the NI/OREQ signal was not included.
4. The 4-bit latch, controlled by the SC/MP 'NADS' signal, was rapidly becoming redundant on the DCR-6 board
  - (a) Because SC/MP was going out of fashion
  - (b) Because new SC/MP CPU cards, e.g. MPA-7, already had the latch on-board.

5. A monostable was needed on the DCR-6 board to 'stretch' the keyboard stroke, so that the CPU was more able to 'catch' a depressed key. This was fine when the CPU was idling in a 'polling' loop, but when it was busy executing programs of other sorts, ~~keyboard interruptions~~ repeated keystrokes were required to break into the programs.

~~It was felt that a latched key~~ An increased monostable duration increased the chances of a keystroke being 'caught' by the CPU in such circumstances, but there was a limit to how much the duration could be increased,

- (a) Because some software would loop back and read the same key again, giving an effect similar to 'keyboard bounce'
- (b) Because very fast keying rates would be ignored if subsequent keystrokes were 'masked' by the stroke of the first.

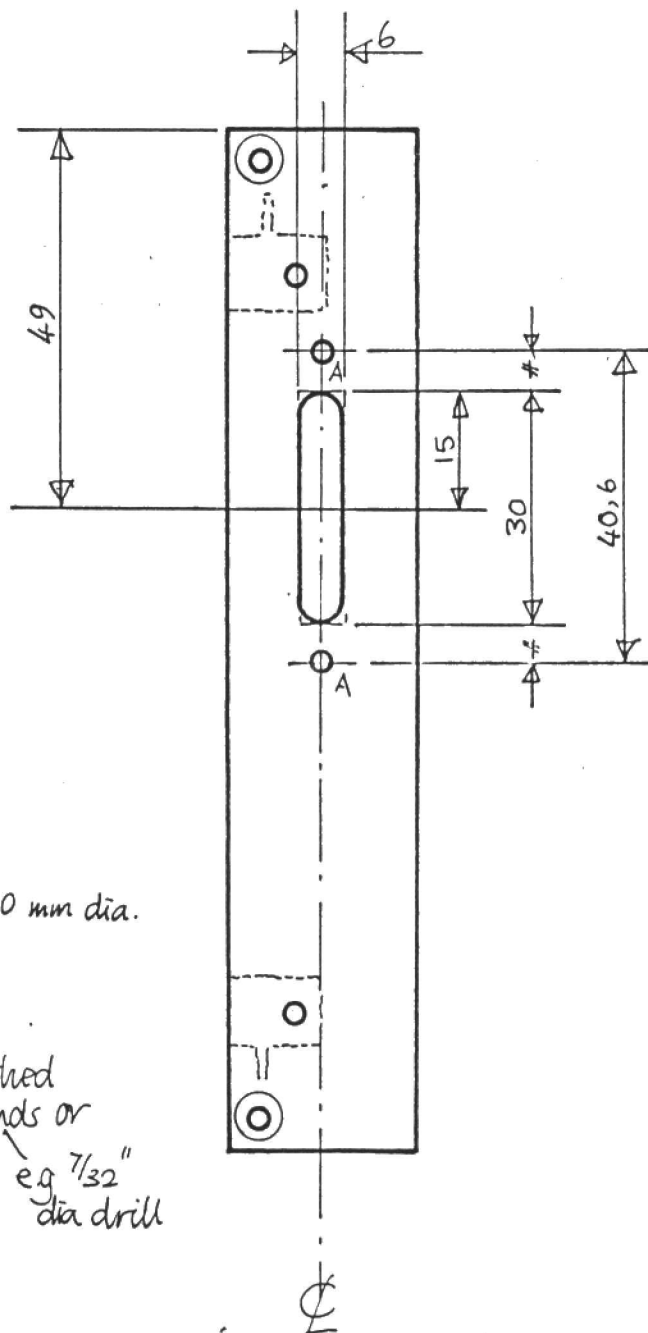
It was therefore felt that a 'latched' keyboard interface would be better. (The 'ultimate' method - an interrupt driven keyboard was not adopted for the new KBP-1X, because not all existing hardware can handle interrupts, and not all existing software either. It would be unfair to expect existing users to have much of their present systems rendered obsolete).

## Advantages of KBP-IX Design

1. Optional 74LS154 device provides all 16 'page selects' and includes provision ~~of~~ for NIMREQ signal. (Note that the only remaining Kenatron cards which needs page select is the VDU-G, all the others have a ~~fully~~ decoded 16-bit address).
2. An 8-bit I/O port, <sup>decoder</sup> (including the NIOREQ signal in the ~~decoding~~ arrangement) is provided. An 8-pole DIL switch lets any one of the possible 256 ports be used for the keyboard.
3. The data from the keyboard is held latched on the KBP-IX Board, and is automatically cleared when the CPU reads the keyboard port. Provision has been made to avoid possible incorrect reading of data in the (unlikely) event of a 'strobe' from the keyboard being received actually during a CPU read - if the strobe is not present at the start of the read cycle it is automatically delayed until the next read cycle.

### Construction.

It is not certain that the KBP-IX board will be produced in the immediate future, and these notes have been produced to enable new users to make their own. The small number of chips involved will fit easily on a standard plug-in breadboard, and can be wired together in a couple of hours.



2 A HOLES 3,0 mm dia.

Slot can be finished  
with rounded ends or  
square  
eg  $\frac{7}{32}$ "  
dia drill

Drwn DMP  
Date 28-3-81  
Scale 1:1

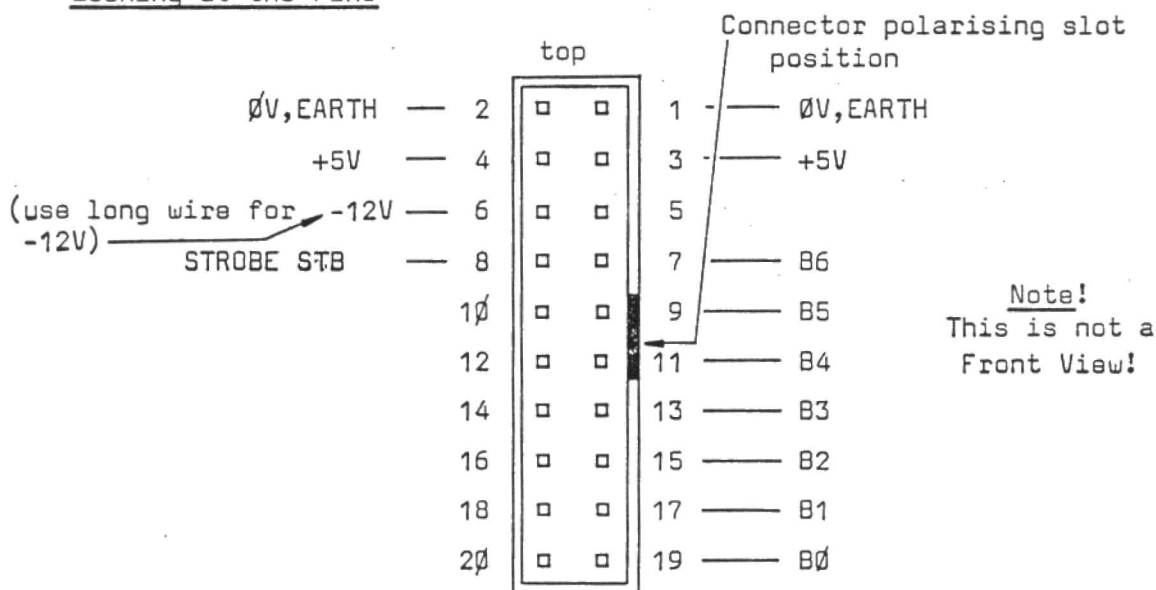
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DCR-6 FRONT PANEL  
(ALSO USED FOR KBP-1X)

## Keyboard Connections

The 'Alphameric's keyboard suits a 20 way ribbon cable connector and it is suggested that the 'Alphameric's signal designations be adopted, ~~for the Custom 80 KBB card~~. (If you are using a different keyboard change its wiring to suit this if you want to build a standard system).

### View of 20 Way Ribbon Cable Connector, Mounted on Front Panel, Looking at the Pins

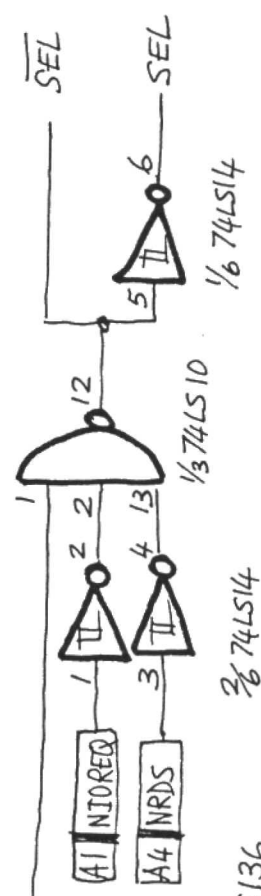
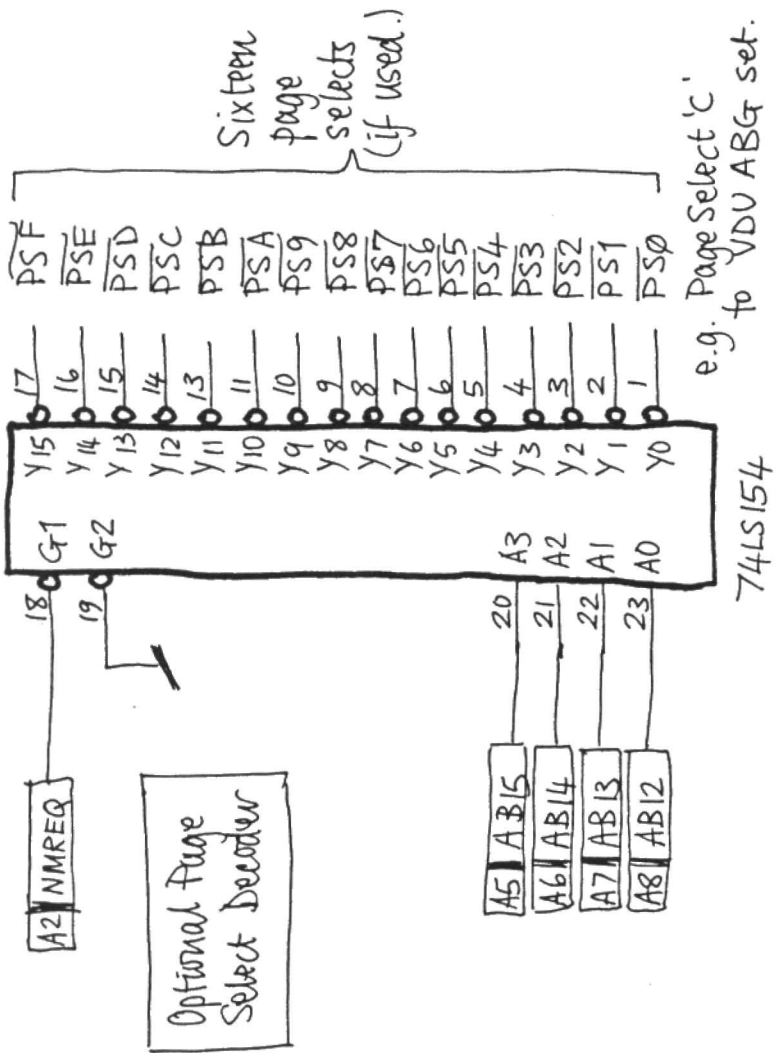
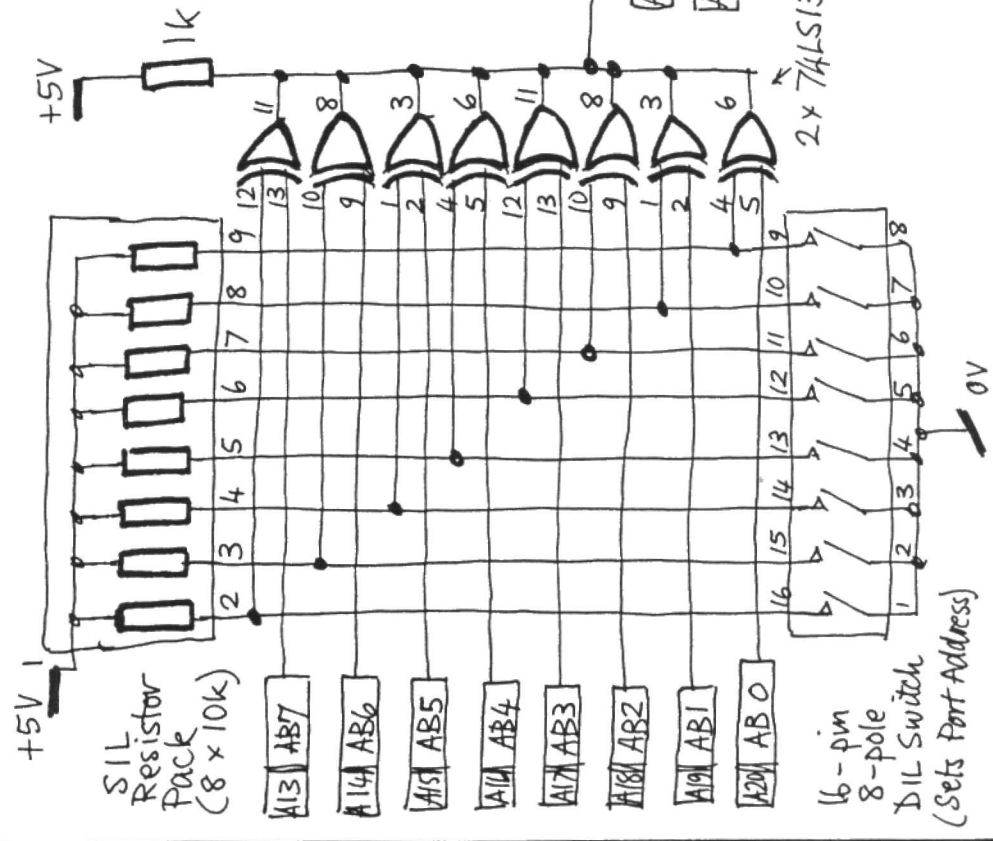


NOTE 1 Make no connection to pins 5, 10, 12, 14, 16, 18, 20.

NOTE 2 Sometimes B0 - B6 are numbered B1 - B7, by keyboard manufacturers.

NOTE 3 Maddeningly, some ribbon cable connector manufacturers use different numbers for 1 - 20 - if in doubt use the polarising slot as being correct, and call the top-most connections pin 1 and 2 according to the diagram. NOTE: that the red identifier on grey ribbon cable is usually the pin 1 identifier.

Throughout: supplies to corner pins  
 Use  $1 \times 22\mu$  &  $4 \times 100n$  as  
 decoupling capacitors. Edge connections  
 as ISBUS allocations.



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Drawn D.M.P	KBP-1X ASCII KEYBOARD
Date 16-6-81	INTERFACE CIRCUIT DIAGRAM
Scale -	

0V





14. 'A' Side ISBUS Preliminary Allocations.

Issue 2 5/7/80  
Issue 3 8/9/80

A1	NI/O REQ	A23	DB6
A2	NMREQ	A24	DB5
A3	NWDS	A25	DB4
A4	NRDS	A26	DB3
A5	AB15	A27	DB2
A6	AB14	A28	DB1
A7	AB13	A29	DB0
A8	AB12	A30	NENIN (TTL line, Daisy 1 in)
A9	AB11	A31	NENOUT (TTL line, Daisy 1 out)
A10	AB10	A32	NRFSH
A11	AB9	A33	RCLK (e.g. Z80 $\phi$ )
A12	AB8	A34	NWAIT (Open Collector line)
A13	AB7	A35	+12V
A14	AB6	A36	+12V
A15	AB5	A37	Polarisation Slot (If used)
A16	AB4	A38	-12V
A17	AB3	A39	-12V
A18	AB2	A40	0V, Earth
A19	AB1	A41	0V, Earth
A20	AB0	A42	+5V
A21	NRST (Open Collector line)	A43	+5V
A22	DB7		

Revn. A: July 1980: A32, A33, allocated to  
now suit new 'Kemitron' range boards

15. 'B' Side ISBUS Preliminary Allocations.

B1	NI/O I/O Disable (o/c)	B23	DB14
B2	NMD Memory Disable (o/c)	B24	DB13
B3	NEMREQ Extended Mem Request	B25	DB12
B4		B26	DB11
B5		B27	DB10
B6		B28	DB9
B7		B29	DB8
B8		B30	TTL line, Daisy 2 in
B9		B31	TTL line, Daisy 2 out
B10		B32	TTL line, Daisy 3 in
B11		B33	TTL line, Daisy 3 out
B12		B34	
B13	AB23	B35	+12V
B14	AB22	B36	+12V
B15	AB21	B37	Polarisation Slot (if used)
B16	AB20	B38	-12V
B17	AB19	B39	-12V
B18	AB18	B40	0V, Earth
B19	AB17	B41	0V, Earth
B20	AB16	B42	+5V
B21		B43	+5V
B22	DB15		

Revn B: Sept 1980 B13-20 allocated